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THE SIGNIFICANCE OF TEMPORY BLINDNESS

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THE SIGNIFICANCE OF TEMPORARY BLINDNESS*

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THE loss of any part of one's vision is an occasion for apprehension, and the cause of this loss becomes the object of intensive search. Partial loss of vision, or temporary total loss of vision, is not uncommon as a symptom of disease or disorder affecting the visual pathways, or of a constitutional disease or disorder. Temporary blindness, particularly, intrigues the physician. The absence of pathologic changes on examination of the eyes may be of as much importance as if definite changes were to be found in some portion of the eye, and it is well known that in some cases of temporary blindness the examination gives negative information.

If blindness occurs in the course of an illness, or following a surgical procedure, considerable apprehension may be aroused as to whether the loss of vision will be permanent. Indeed, permanent blindness may occur as a complication in rheumatic fever, Bright's disease, multiple sclerosis, tabes, meningitis, influenza, and in a number of less common acute, chronic, or recurrent diseases. From the effects of emboli following surgical operations in the pelvis, or on the extremities, temporary loss of vision occasionally is encountered, and even permanent blindness has been reported. Procedures apparently as harmless as aspiration of fluid from the pleura may bring on sudden loss of vision, to the consternation of the surgeon and to the dread and alarm of the patient and his friends.

Whether temporary blindness or permanent blindness is to be the lot of one in whom loss of vision occurs is often a matter of the extent to which the process directly responsible has gone. Many conditions which lead to temporary blindness lead also to permanent blindness. If changes in the media of the eye or atrophy of the nerve have been extensive, it can be definitely determined that vision never can be restored. Because of the difficulty in determining whether or not blindness will be only temporary, and because of the necessity for determining the cause early in the course of the affliction, thorough examination in cases of blindness becomes of great importance. For the proper examination of a patient who complains of temporary blindness, there is required a knowledge of the pathology of the eye and the visual pathways; but often it is necessary for the physician to match his wit against that of a malingerer or one who is actually deceived about his own vision. A carefully obtained anamnesis is the first step in the examination. Not only is it necessary to listen to the story of the patient but it is well to get this history independently from relatives or others who have observed him. Loss of vision, without adequate pathologic changes to account for it, is found in persons of nervous instability. The history may be of importance in arriving at a diagnosis.

*From the Section on Ophthalmology, The Mayo Clinic, Rochester, Minn. Read before the North Dakota State Medical Association, Bismarck, N. D., May 27, 1930.

FUNCTIONAL BLINDNESS

Hysterical amblyopia.—Case 1. A boy, aged eight years, in apparently good health, was the only child of a family that lived in a small Canadian village. He had an abnormally large head, but he had grown up among his playmates, and no mention was ever made of this condition in his hearing. He entered kindergarten and was making satisfactory progress when the parents moved to another part of town and the boy was placed in another school. A few weeks after he had been transferred to this school, he was sent home with a note from the teacher, saying that the boy complained of headaches, and considerable drowsiness, and that he was unable to see writing on the blackboard that was plainly visible to other children in the room.

A general examination failed to show cause for the boy's poor vision. An attempt was made to keep him in school, but the defect in vision increased until he was unable to get about alone. Physicians near his home, unable to understand any reason for his complaint, referred him to specialists in another city. The father was told that the boy had a tumor of the brain, and that in all probability he would never see again. It was because of this diagnosis that physicians at The Mayo Clinic were consulted.

Early in the course of the examination, and after a thorough search had failed to reveal any disorder or disease of the eyes, the father chanced to remark that in the neighborhood in which he first lived the children were very careful never to mention this boy's deformity, so that the boy himself apparently was unaware of any difference between himself and his playmates. After he had entered the new school, he was taunted by his schoolmates with the epithet "big-head," an insult which

evidently hurt him and gave him a feeling of inferiority. The defense reaction of this child was to remove himself from the children who would hurt him and his chief defense took the form of hysterical blindness.

The boy was under observation for one week while he was at the clinic with his father and enjoyed the privilege of frequent visits to the zoölogical park and other places of interest. Complete vision was restored merely by a change of environment.

Comment.—Hysterical amblyopia, sometimes spoken of as retinal anesthesia, is functional blindness without pathologic change of the eyes or visual pathways. It is more common among women than men, and more common among young persons and children than older persons. It is not infrequent among girls in their teens who find some difficulty in adjusting themselves to disagreeable social circumstances or exaggerated parental solicitude. It is always bilateral, usually gradual in onset, and unassociated with headache, pain, or constitutional disease. The diagnosis is often suggested by the history, and is established by elimination of pathologic processes. It is confirmed by the restoration of good vision, by whatever effective means may be adopted. In some cases, I believe hysterical blindness becomes permanent.

It is essential, in the treatment of hysterical amblyopia, that one of two things be brought about: that the conditions under which the amblyopia developed should be changed, or that a situation be substituted which is more intolerable than the first. Most patients with hysterical amblyopia will recover their vision if kept in isolation, with their eyes bandaged and on a milk diet. In treatment of young persons, it is necessary that only such attention as is necessary be provided and that the company of parents or other visitors be not allowed. Two weeks of such isolation is usually sufficient to bring about restoration of vision. Recurrences among young persons are rare. Substitution neurosis may appear, but if steps are taken to correct the original cause of the disturbance, useful vision as a rule is maintained.

Amblyopia associated with migraine.—This type of functional neurosis is much more difficult to understand and far more difficult to treat. The blindness may take the form of scotoma, of hemianopsia, or even of complete blindness. The blindness usually precedes a severe migrainous headache, and may persist for hours or days after the headache has disappeared. Frequentl warning of the onset of blindness is given in tl form of aura or floating spots before the eye Mild cases proceed no farther than scintillatir scotoma or subjective sensations of flashes c light. In such cases not all attacks of migrair are associated with amblyopia, but severe attacl of headache, with some degree of blindness, ma be frequent and often periodic. Although the are more common in persons about the age c fifteen to twenty-five, they may persist well b yond the age of fifty.

There must be other criteria, however, suff cient to establish the diagnosis of migraine, b fore one can assume that blindness associate with headache is not significant of organic di ease. I have seen total permanent blindness c one eye that seemed to be due to repeated attack of migraine.

BLINDNESS DUE TO PRIMARY DISEASES OF THE EY

Glaucoma.—Temporary blindness is an earl and frequent sign in simple glaucoma. Tran sient, high intraocular tension brings about defi nite reduction in vision through cloudiness of th cornea. The cloudiness clears away, with resto ration of vision when the tension is reduced. A the glaucoma is usually limited to one eye, th blindness is also limited to one eye. I have ha under observation a patient whose intraocula tension could be changed at the will of the physi cian from less than normal to more than fiv times normal, by the alternate instillation of ho matropine and eserine. With each rise of ten sion, the vision would be reduced so that only perception of light remained. When the tension was reduced, vision came back to 6/5. The con dition was limited to one eye. The glaucoma, however, could not be controlled indefinitely by miotics; so it became necessary to resort to op eration to bring about permanently low tension The more frequent attacks of hypertension from which the patient had suffered caused partia atrophy of the optic nerve, and partial perma nent loss of vision in the eye resulted. It is pos sible for a person to have a marked increase of tension in both eyes at the same time, wit marked reduction of vision. Careful exam tion of the eyes during the time when vision i poor will clearly reveal the diagnosis. Treatme instituted early in the course of the disease ofte

may save considerable vision which otherwise would be permanently lost.

Interstitial keratitis.—One of the most alarming inflammations of the eye, as well as one of those which gives a good prognosis, is interstitial keratitis, an inflammation of the cornea of children and young adults afflicted with hereditary syphilis. Although it is usually found in children between the ages of eight and sixteen years, it sometimes appears earlier in childhood. One eye is affected a few days to a few weeks in advance of the other, but both eyes are always affected, usually to the same extent. The second eye will become involved in spite of the most vigorous efforts to ward off its involvement. Hereditary syphilis often is not recognized until the onset of keratitis and frequently it becomes the duty of the oculist to investigate the family for other evidences of the disease, and to inform the parents of the seriousness of the malady. Delayed keratitis, occurring after the age of twenty-five years, may run the same general course as keratitis in younger persons, but appears to be more protracted. The end-result is the same. The acute stage lasts for six to ten weeks. During this time the patient is temporarily blind, with photophobia and lacrimation. During convalescence there is little, if any, pain, but light is poorly tolerated, necessitating the use of dark glasses until the cornea is clear. The prognosis as regards vision is good.

Keratitis associated with conjunctivitis is sometimes a complication of the exanthematous diseases, particularly measles, scarlet fever, and smallpox. Here the disease frequently takes the form of corneal ulcers which leave white scars on the cornea, a permanent obstruction to vision.

DISEASES OF THE OPTIC NERVE

Inflammation of the optic nerve is a common cause of temporary blindness, seen most often as a unilateral affection, and appearing as a complication in a large number of general conditions and a few local diseases. Optic neuritis is always accompanied by reduction in vision when it is. Indeed, the cloudiness of vision may be the first occurs in a previously healthy and functioning eye, the first symptom noticed by the patient. Although usually bilateral, it may be unilateral or alternating. It may be secondary to disease in the proximity of the optic nerve, although it is often metastatic from some chronic local or constitutional inflammation.

Syphilis.—Probably the most common cause of optic neuritis given in the literature and texts of twenty-five years ago was syphilis. Whatever the relationship was considered to be at that time, I am sure that it will not hold today. There are several reasons why we have to revise our ideas regarding the rôle of syphilis as one of the common causes of blindness, both as regards the optic nerve and the anterior segments of the eye. Let us not forget that in the last twenty-five years the Wassermann reaction has aided tremendously in determining the presence or the activity of syphilis, and that the diagnosis of syphilis in the face of repeatedly negative Wassermann reactions must be supported by a preponderance of positive evidence. Then, too, syphilis is recognized earlier and treated much more effectively than it was a few years ago. It is not uncommon, now, for the disease to be arrested before it reaches the secondary stage, and tertiary syphilis, except in forms of disturbances of the central nervous system, is rarely seen. Seldom is optic neuritis seen as a complication where large numbers of cases of primary and secondary syphilis are seen. It is asserted that the race is becoming immune to the disease and that it is noticeable in European as well as in American clinics that the severe secondary and tertiary lesions of syphilis, once so common, are conspicuously absent. Optic atrophy, or ocular tabes, still takes its toll in blindness, but there the loss of sight is permanent and not unexpected, for it occurs in about 10 per cent of the cases of syphilis of the central nervous system.

Retrobulbar neuritis.—The greatest controversy among oculists over optic neuritis rages about the causes of retrobulbar neuritis. This term should be applied only to those cases in which there has been a marked loss of vision, central scotoma, and retardation of pupillary reflex, without change in the optic disk or other obvious disorder of the globe or the media. The only symptom is loss of vision, of rapid onset unaccompanied by pain. Examination of the visual field will reveal a large central scotoma, loss of perception of color, and rise in the threshold of perception of light. In other words, there is a block along the conduction path of the retinal fibers, particularly in the macular bundle. It has been agreed that this block may be brought about (1) by pressure from an extraneural source, such as bulging sinuses, abscesses, tumors, or hemor-

rhages; (2) by local inflammation within the nerve or the nerve sheath through direct extension or possibly through metastasis, and (3) by toxins. If pressure from an extraneural mass can be demonstrated there is, in all probability, an answer to the question of the cause of the retrobulbar neuritis. The chief difficulty, however, has been to show conclusively that such pressure does exist in the absence of clearly demonstrable tumor and abscesses. Disease of the nasal accessory sinuses is held by a large group of outstanding oculists to be of such importance in retrobulbar neuritis that, regardless of rhinoscopic data and interpretation of roentgenograms, they will direct the opening of the paranasal sinuses by the rhinologist, and will assume all responsibility for the procedure, in the mistaken notion that ventilation and drainage of an apparently normal sinus is adequate to restore vision. A list of such cases can be supplied at will which on first consideration seem to support the argument that early surgical invasion of the sinuses is followed by restoration of vision in a few hours to a few days, and hence lends support to the theory that the retrobulbar neuritis in that case was due to disease of the sinuses. However, febrile treatment must be considered; foreign protein, without surgical invasion of the sinuses, has been used with equally good result. If it is necessary to ventilate and to drain the sinuses, how can the effect of protein therapy be explained? If equally good results are obtained, is it not better practice to use nonsurgical treatment and to avoid postoperative changes in the nose, that in themselves may give rise to discomfort and even disease?

It often has been demonstrated that a common cause of retrobulbar neuritis is multiple sclerosis, a disease of the nervous system that probably has no relation to any disease of the sinuses, although the rôle of focal infection in the production of multiple sclerosis is not clearly understood. Multiple sclerosis is a disease of young adults who often are apparently in good health. The symptoms, in mild cases, often are difficult to elicit and the disease may run for years before a satisfactory diagnosis can be made. In every case of retrobulbar neuritis in a young adult, multiple sclerosis should be thought of first, and in the absence of perfectly obvious causes of another nature, the treatment should be carried out along medical lines. Retrobulbar neuritis may be the only outstanding symptom of multiple sclerosis for years. I have recently seen, in a woman aged twenty-six years and in a man aged thirty-three years, the second attack of retrobulbar neuritis after ten years, with no ocular disturbance in the interim, and with gradually developing signs of multiple sclerosis during the last few years. In each case, vision was reduced barely to perception of light in one eye at the beginning of treatment and was restored to 6/6.

Almost complete blindness in one eye may be accompanied by partial blindness or hemianopsia in the other eye, a circumstance that may escape notice unless the visual fields of both eyes are carefully tested. Temporary blindness of one or both eyes, without change in the globe or disk, is most likely to be due to retrobulbar neuritis, but this diagnosis, once made, rarely should be used as an excuse or a reason for surgical invasion of the paranasal sinuses in the absence of visible pathologic change in the nose.

EMBOLISM, TOXEMIA, AND TOXICOSIS

It may seem rather incredible that sudden blindness should follow a simple procedure like thoracic puncture for pleural effusion; yet there are a number of authentic recorded cases. If an open cannula is employed in the puncture, air may be introduced into the veins, which, during a part of respiration, are under negative pressure. The general symptoms of air embolism, such as apprehension, fear of impending death, faintness, suffocation, and blindness, all come on suddenly, much to the consternation of the surgeon. The blindness is due to air in the arterioles of the retina, and the consequent ischemia. If only a small amount of air enters the vessels, the blindness may not be complete, and may clear away in a short while. I know of no case of total, permanent blindness from that cause.

Embolism of the retinal arteries is seen in cases of endocarditis and general vascular disease, including arteriosclerosis, more often, I think, in persons aged more than fifty years. Thrombosis of the retinal veins is probably seen as commonly as a result of arteriovenous compression or of disease of the wall of the vessel. There results infarction of the retina, with edema, hemorrhages, and exudates. A scotoma subtends the affected part of the fundus. If the central vessels of the optic nerve are occluded, permanent, total loss of vision results. In the toxe-

nia of pregnancy there sometimes occurs such dema of the retina that vision is reduced to the e perception of light. The pathologic change s probably not limited to the retina, but involves he optic nerve in more or less severe optic neuritis, which may leave the patient totally blind f it persists for several weeks. In the active stages of retinitis, the choroid coat may be temporarily detached by serous exudate. I have seen two such cases with recovery of vision after elimination of the cause of the toxemia. Neuroretinitis, following miscarriage and subsequent uterine infection, may be followed by almost complete blindness, and constitutes one of the hazards of induced termination of pregnancy. Yet it sometimes becomes the duty of the oculist to decide, in a case of marked involvement of the eye in toxemia of pregnancy, whether vision can be restored without emptying the uterus. If pregnancy complicates multiple sclerosis, the issue is generally fatal. With the splendid prenatal care that most mothers now receive, the combination of toxic nephritis, high blood pressure, and albuminuric retinitis is less seldom seen. If the retinitis occurs late in the seventh month of pregnancy, expectant treatment may be adopted with a moderate degree of safety from permanent blindness, although every possible means should be adopted to combat the toxemia. In case of intractable hypertension, with albuminuria and retinitis, it is doubtful if many patients regain much of their vision if the condition has existed for more than six or eight weeks. Consideration of the termination of pregnancy is the only alternative to almost certain blindness in such cases, and must be undertaken, if at all, before irreparable injury has been done. In one patient under my observation the systolic blood pressure was lowered more than 100 points in twelve hours after the uterus had been emptied, and the retinitis began to clear away within a few days. Normal vision was restored after four months. It is the province of the general physician to determine the probable hazard of future pregnancies in women who have suffered retinitis with toxemia, but it is well known that women who have partial permanent blindness as a result of toxemia of pregnancy have gone through subsequent pregnancies without suffering the same complications.

If I were to mention all of the conditions which may be complicated with temporary blindness it would be merely to catalogue a number of them that are rarely encountered, or that are so well known that any further comment is uncalled for. Except in industrial centers, where factory workers are exposed to poisonous products, impure alcohol and tobacco probably head the list of poisons that produce blindness in varying degree. Quinine taken in large doses, as an ecbolic, will produce optic neuritis, with subsequent partial or total atrophy of the optic nerve. In ordinary doses, such as are given in the treatment of malaria for instance, it is a safe drug. The arsenicals, used in the treatment of syphilis of the central nervous system, particularly general paresis, have been suspected of producing optic atrophy. Further study of the effects of these drugs, however, would seem to indicate that only those patients who would have lost their vision through the disease had no treatment been given, have gone on to blindness. The drugs, administered in the same doses to persons free from disease of the central nervous system, have no effect on the eyes. It seems probable, therefore, that not the drugs, but the disease for which the drug is administered, must be held to account for blindness in cerebrospinal syphilis. The ocular conditions following injuries, diseases of childhood, septicemia, focal infections, constitutional diseases such as syphilis, tuberculosis, diabetes, anemia, toxemia from chemicals and drugs, hypertension, nephritis, tumor of the brain, and a host of otherwise insignificant disorders which may terminate in partial or complete temporary blindness, constitute an interesting chapter in the history of medical investigation and practice. Everyone who is engaged in the practice of medicine is concerned with the diagnostic signs revealed by the ophthalmoscope and the perimeter, and the well trained oculist is a most valuable consultant.

CIRCULATORY TESTS PREVIOUS TO AMPUTATION*

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THERE have been a number of tests recently developed to test the efficiency of the circulation in the extremities, but according to McKittrich and Root (1928), "At present no simple, practical, and accurate laboratory or clinical test is available by which the degree of circulatory disturbance in a given foot can be measured or by which the point at which amputation should be done is indicated. . . . Fortunately the patient usually gives sufficient clinical data to warrant an estimate of the circulatory condition of the foot sufficiently accurate for intelligent treatment."

Still some of these tests are of value in early diagnosis, in the differential diagnosis of these conditions, and also in giving corroborative evidence of the degree of circulatory disturbance. An attempt has been made in this paper to collect the various tests which have been proposed.

HISTORY

Frabricius Hildames (1560-1624) advised amputation at an early stage in gangrene and he advised that the incision should be made in the sound, and not in the decayed flesh.

Pott (1785) gives a good description of arteriosclerotic gangrene to which little could be added today. He states, "It frequently happens to persons advanced in life, but is by no means peculiar to old age. . . . It has by some been supposed to arise from an ossification of vessels, but for this opinion I never could find any foundation but mere conjecture." He advised allowing gangrenous toes to drop off of themselves.

Charcot (1856) called the fatigue and pain on exercise "claudication intermittente." Maurice Raynaud (1862) was the first to maintain that gangrene could occur without vascular occlusion. Billroth (1869) in speaking of arteriosclerotic gangrene said that we must amputate in the thigh as soon as the popliteal artery pulsation cannot be felt. Winiwarter (1879) used the terms "endarteritis" and "endophlebitis" in describing the condition of a man aged 57 with obliterative arterial disease of the extremities. From his description of the vessel pathology it is now evident that this was thromboangiitis obliterans. König (1887) first demonstrated that good results were obtained under careful aseptic operation in diabetic patients. Results were bad previous to the advent of aseptic surgery because the resistance of the tissues in the extremities was so low as a result of poor circulation. Marshall di Calvi was the first to call attention to the frequent relationship between diabetes and gangrene. Landlow (1892) described a large number of favorable results in senile and diabetic cases where a more distal amputation than through the thigh was done. Heidenhain (1891) so long as the gangrene involved the digits only, awaited a line of demarcation, but if it involved the foot he amputated every case above the condyles of the femur. In doing this he was influenced by the bad results he saw in lower amputations performed by Küster, but Küster also adopted a more proximal site for operation later. Buerger in 1908 established as a pathological entity the condition now often called Buerger's disease and called it obliterating thrombo-angiitis.

CLINICAL HISTORY

Some special features should be stressed in taking the history of these patients. What were the precipitating factors? Was it exposure to cold? Was it injury? Did it occur without any known precipitating cause? Is there abnormal fatigue in any part of the extremity? How much exertion is necessary to bring on this fatigue? Is there claudication? Is there rest pain? Have there been color changes, vasomotor disturbances, or phlebitis?

PHYSICAL EXAMINATION

Final opinion will be based largely upon physical findings. The following conditions should be looked for:

1. General appearance of the limb.
   a. Dry scaling atrophic skin.
   b. Irregularity of the nails.

*From the Department of Surgery of the University of Minnesota. Presented before the annual meeting of the Minnesota State Medical Association, Duluth, July 15, 1930.

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